

# **HATCHERY EVALUATION REPORT**

**Big Creek Hatchery - Winter Steelhead**

**March 1997**

## **Integrated Hatchery Operations Team (IHOT)**

**HATCHERY EVALUATION REPORT**

**Big Creek Hatchery - Winter Steelhead**

**An Independent Audit Based on Integrated Hatchery Operations Team  
(IHOT) Performance Measures**

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## **Executive Summary**

This report presents the findings of the independent audit of the Big Creek Hatchery - Winter Steelhead program. The hatchery is located 16 miles east of Astoria and is approximately 3 miles upstream from Big Creek's confluence with the Columbia River. The hatchery is used for adult collection, egg incubation, and rearing of winter steelhead, fall chinook, coho, and sea-run cutthroat.

The audit was conducted in 1996-1997 as part of a 2-year effort that will include 67 hatcheries and satellite facilities located on the Columbia and Snake River system in Idaho, Oregon, and Washington. The hatchery operating agencies include the U.S Fish and Wildlife Service, Idaho Department of Fish and Game, Oregon Department of Fish and Wildlife, and Washington Department of Fish and Wildlife.

### **Background**

The audit is being conducted as a requirement of the Northwest Power Planning Council (NPPC) Strategy for Salmon and the Columbia River Basin Fish and Wildlife Program. Under the audit, the hatcheries are evaluated against policies and related performance measures developed by the Integrated Hatchery Operations Team (IHOT). IHOT is a multi-agency group established by the NPPC to direct the development of new basinwide standards for managing and operating fish hatcheries. The Bonneville Power Administration (BPA) contracted with Montgomery Watson to act as an independent contractor for the audit.

IHOT has established five basic policies that cover: (1) hatchery coordination, (2) hatchery performance standards, (3) fish health, (4) ecological interaction, and (5) genetics. The audit focuses on all these policies, with the exception of hatchery coordination. These policies are set forth in *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (IHOT 1995)*. That document is the source for the performance measures that are the basis of this audit.

## **The Audit Process**

The audit was based on the facility management's response to a 109-page questionnaire. This audit form was completed through a five-step process in which:

- Information was obtained from headquarters.
- The hatchery manager was asked to fill out and return the audit form.
- A 1-2 day site audit visit was conducted to inspect facilities, review hatchery records, discuss audit form responses, and develop remedial action plans.
- A compliance report was developed to document the compliance status of each performance measure. This report was then shared with the hatchery manager and IHOT representative.
- This hatchery evaluation report was written to document compliance with IHOT performance measures and develop cost estimates for remedial actions when needed.

## **Big Creek Hatchery - Winter Steelhead Results**

The Big Creek facility includes 2 ponds for adult holding, 30 concrete raceways, 1 rearing pond, 2 Canadian troughs, and incubation facilities. Big Creek Hatchery began operation in 1941 as a

state-funded facility. It was refurbished in 1957 under the Mitchell Act as part of the Columbia River Fisheries Development Program - a program to enhance declining fish runs in the Columbia River Basin. The purpose of the hatchery is to produce adult salmon and cutthroat trout that will contribute to NE Pacific and Columbia River Basin commercial and sports fisheries.

The Big Creek Hatchery - Winter Steelhead program was in general compliance with most of the performance measures. In the area of program objectives, the hatchery did not have a survival goal for green-egg to eyed-egg, eyed-egg to fry, fry to smolt, and smolt to adult life-stages. The audit found that the hatchery was not in compliance with adult holding facilities, water quality monitoring requirements, alarm criteria, and pathology-free water criteria, which are all facilities requirements. The hatchery was not meeting the flow criteria for incubation and the density criteria for early rearing. The hatchery needed to develop written incubation and rearing standards for the IHOT Operations Plan and develop a smoltification goal and monitoring plan. In the compliance area for fish health policy, the hatchery was not using foot baths in incubation and was not meeting all the sanitation protocols. The hatchery did not have a written broodstock collection plan, spawning protocols, or a Genetics Monitoring and Evaluation Program.

The specific areas in which the Big Creek Hatchery - Winter Steelhead program requires remedial actions based on the IHOT performance measures are listed below. These remedial actions are listed in alphabetical order without intent of ranking or otherwise assigning priority:

- Conduct fisheries contribution studies
- Conduct IHOT QA/QC test for feed preparation
- Develop a written hatchery M&E plan
- Develop alarm log
- Develop an additional 300 gpm of disease-free water for incubation

- Develop approved genetics M&E plan
- Develop smoltification goal and monitor
- Develop survival goal for green-egg to eyed-egg, eyed-egg to fry, and smolt to adult
- Develop written broodstock collection plan
- Develop written spawning protocols
- Develop written standards for incubation and rearing for the IHOT Operations Plan
- Document adult contribution
- Follow IHOT procedures for checking other alarms weekly
- Follow IHOT protocols for not exposing feed or feed containers to light or heat
- Follow IHOT protocols for sanitation of equipment and rain gear utilized in  
broodstock handling or spawning prior to its use elsewhere in the hatchery
- Follow IHOT protocols for sanitation of rearing vessels after fish are removed and  
prior to introducing a new fish lot or stock
- Follow IHOT protocols for transportation facilities
- Install intake alarm on Big Creek
- Install alarms on large rearing pond and adult holding ponds
- Install alarms on rearing ponds
- Install foot baths
- Monitor DO and TGP and record
- Rebuild adult holding and spawning facility
- Review density criteria for early rearing
- Review IHOT flow criteria for the deep trough incubators
- Review need for new fingerling release channel
- Run analysis for water chemistry parameters, turbidity, alkalinity, hardness, and  
contaminants

Non-compliance issues resulting from items beyond human control or Performance Measures not relevant to this hatchery (Type 1 in Table 3, Section 4 of this report) were not listed above.

## Facility Description

**Name:** Big Creek Hatchery

**Stock/Species:** Fall Chinook (Big Creek Stock)

Fall Chinook (Big Creek/Rogue Stock)

Coho

Winter Steelhead

Sea-run Cutthroat

**Operating Agency:** Oregon Department of Fish and Wildlife

**Funding Agency:** Mitchell Act

**Location:** The hatchery is located 16 miles east of Astoria and is approximately 3 miles upstream from Big Creek's confluence with the Columbia River.

**Address:** Route 4, Box 594

Astoria, OR 97103

**Hatchery Manager:** Mr. David Rieben

**Phone:** (503) 458-6512

**Fax:** (503) 458-6529

**Purpose:** Big Creek Hatchery began operation in 1941 as a state-funded facility. It was refurbished in 1957 under the Mitchell Act as part of the Columbia River Fisheries Development Program - a program to enhance declining fish runs in the Columbia River Basin. The purpose of the hatchery is to produce adult salmon and cutthroat trout that will contribute to NE Pacific and Columbia River Basin commercial and

sports fisheries.

**Production Goal:**

**Fall Chinook (Big Creek Stock)**

Produce 5,700,000 smolts (71,250 lb) and 5,200,000 fingerlings (38,670 lb) for on-station release.

Provide 6,810,000 eggs for ODFW programs.

**Fall Chinook (Big Creek/Rogue Stock)**

Produce 1,000,000 smolts (67,778 lb) for on-station release.

**Coho**

Produce 535,000 smolts (48,636 lb) for on-station release.

Produce 60,000 smolts (4,000 lb) for release into the Tualatin River.

**Winter Steelhead**

Produce 60,000 smolts (12,000 lb) for on-station release.

Produce 63,000 smolts (6,300 lb) for transfer to Klaskanine Hatchery.

Provide 557,300 eggs for ODFW programs.

**Sea-run Cutthroat**

Produce smolts when adults are available.

**Water Supply:**

There are four water sources for the hatchery: Big Creek, Mill Creek, and two springs. Current water rights total 36,158 gpm plus an additional 4.2 cfs reservoir water right.

**Facilities:**

|                       |   |
|-----------------------|---|
| Adult Holding:        | 2 concrete adult holding ponds, 6,513 and 15,880 cf |
| Incubation:           | 4 16-tray vertical incubators                       |
|                       | 48 shallow troughs - 13 cf each                     |
|                       | 16 shallow troughs - 26 cf each                     |
| Early Rearing:        | 2 Canadian troughs - 108 cf                         |
| Raceways:             | 9 concrete raceways - 4400 cf each                  |
|                       | 21 concrete raceways - 4400 cf each                 |
| Rearing Ponds:        | 1 concrete rearing pond - 12,112 cf                 |
| Satellite Facilities: | None  |

## Compliance Status

The hatchery audits are based on compliance with written IHOT performance measures. These performance measures are documented in *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (referred to as *IHOT 1995* in this report).

The purpose of the performance measures is to implement new basinwide policies that provide regional guidelines for operating anadromous hatcheries in the Columbia Basin.

The audit focuses on performance measures for IHOT policies that cover (1) hatchery performance standards, (2) fish health, (3) ecological interaction, and (4) genetics. These performance measures are intended to guide hatchery operations once production is established. For that reason, the hatchery operations audit included broodstock collection, spawning, incubation of eggs, fish rearing and feeding, fish release, equipment maintenance and operations, and personnel training. Production priorities are beyond the scope of this audit.

Based on *IHOT 1995*, a detailed 109-page audit form was developed. The audit form divided the performance measures into six major sections along major program and technical criteria areas. Two additional sections (sections 1 and 8) include general information and expenditure information needed for this Hatchery Evaluation Report and blank forms for additional comments. The following is the basic structure of the IHOT audit form:

Section 1          Performance Measures for General Information and Expenditure  
Information (PMs General 1-2)

Integrated Hatchery Operations Team (IHOT) 1995. *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries*, Bonneville Power Administration, Portland, Oregon.

|           |  |
|-----------|--|
| Section 2 | Performance Measures for Program Objectives (PMs 1-4)        |
| Section 3 | Performance Measures for Facility Requirements (PMs 5-15)    |
| Section 4 | Performance Measures for Hatchery Practices (PMs 16-25)      |
| Section 5 | Performance Measures for Fish Health Policy (PMs 26-34)      |
| Section 6 | Performance Measures for Ecological Interactions (PMs 35-38) |
| Section 7 | Performance Measures for Genetics Policy (PMs 39-43)         |
| Section 8 | Blank Forms for Additional Comments.                         |

Several performance measures are repeated in various sections of the audit form. These performance measures overlap in *IHOT 1995* and were retained to allow individuals interested in specific portions of the audit (such as Genetics or Fish Health) to determine the compliance status of all performance measures for a given topic in one location. A repeated performance measure is indicated by shaded text.

## The Hatchery Audit Process

The hatchery audit will be conducted over a 2-year period that concludes in 1997. At each hatchery, a five-step process was used to complete the overall hatchery audit.

This process consisted of research and onsite visits. The site visit at the Big Creek Hatchery was conducted on March 18, 1997.

The following is the five-step audit process:

1. Information was obtained from headquarters.
2. The hatchery manager was asked to fill out and return the **Audit Form**.

3. A 1-2 day site audit visit was conducted at each hatchery. During that visit an audit team inspected facilities, reviewed hatchery records, discussed audit form responses, and developed remedial action plans when appropriate.
4. During the site visit, the compliance status of each performance measure was discussed with the hatchery manager and IHOT representative. A portion of the Hatchery Evaluation Report was sent to the hatchery manager following the audit visit as a **Compliance Report**. That Compliance Report is Table 2 of this report.
5. Information from steps 1-4 was used to prepare a draft **Hatchery Evaluation Report**. This draft report was submitted to the operating agencies for review of the information used to determine compliance. Based on review and comments, a final Hatchery Evaluation Report was developed. The final report documents the compliance of a particular hatchery with the IHOT performance measures and presents cost estimates to correct any deficiencies.

## **Compliance Status of Big Creek Hatchery - Winter Steelhead**

The following table includes information on life-stages that are held on this facility for some portion of their rearing cycle (Table 1). For multi-facility programs, summary cost and contribution data is presented at the facility where rearing occurs. For the compliance status relating to performance measures that do not occur at this hatchery, please refer to the Hatchery Evaluation Reports for the hatcheries and stocks listed in Table 1. A check mark (✓) indicates that the specific life-stage is held at this facility.

This section documents the compliance status of the Big Creek Hatchery - Winter Steelhead program. Each performance measure is presented in a table taken from the audit form (Table 2). The compliance status is identified by the following categories:

- **N/A** (not applicable)
- **Yes** (in compliance)
- **?** (unknown; generally due to unavailability of information to determine compliance)
- **No** (not in compliance).

Remedial actions are suggested for performance measures not in compliance. These remedial actions are grouped into categories and listed in Section 4 of this report, where the cost of the required remedial actions is also presented.

**Table 1 Summary Program Information for Big Creek Hatchery - Winter Steelhead**

| Component           | Location of Adult Holding, Spawning, Incubation, and Rearing |                     |  |  |  |  |
|---------------------|--|---------------------|--|--|--|--|
|                     | Big Creek Hatchery   | Gnat Creek Hatchery |  |  |  |  |
| Adult Collection    | 4  |                     |  |  |  |  |
| Adult Holding       | 4  |                     |  |  |  |  |
| Spawning            | 4  |                     |  |  |  |  |
| Fertilization       | 4  |                     |  |  |  |  |
| Incubation          |  |                     |  |  |  |  |
| green-to-eyed       | 4  |                     |  |  |  |  |
| eyed-to-hatch       | 4  | 4                   |  |  |  |  |
| Rearing             |  | 4                   |  |  |  |  |
| fry                 | 4  | 4                   |  |  |  |  |
| fingerlings         | 4  | 4                   |  |  |  |  |
| smolts              | 4  | 4                   |  |  |  |  |
| Acclimation/release | 4  | 4                   |  |  |  |  |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

| PM # | Description of Performance Measure  | Compliance Status |                     |   |    | Basis for Compliance or<br>Non-Compliance              | Remedial Action Needed for<br>Compliance |
|------|---|-------------------|---------------------|---|----|--|--|
|      |   | N/A               | Yes                 | ? | No |  |  |
| #1   | Are the hatchery programs outlined in a subbasin management plan?   |                   | 4                   |   |    | Columbia Basin System Planning<br>Production Plan      |  |
| #2   | Is the hatchery operating under a current hatchery operational plan?<br><br>Is it understood by staff?<br><br>Is it being followed? |                   | 4<br><br>4<br><br>4 |   |    | IHOT Operations Plan                                   |  |
| #3   | Is a hatchery monitoring and evaluation plan in place?<br><br>Do you have a written monitoring and evaluation plan?                 |                   |                     |   | 4  | Punch card data only                                   | Develop a written hatchery M&E plan      |
| #4a  | Adult contribution to fisheries, spawning grounds, and hatchery   |                   |                     |   | 4  | Review of records                                      | Document adult contribution              |
| #4b  | Adult pre-spawning survival as compared with established goal   |                   |                     |   | 4  | Review of records; in compliance 1 out of last 3 years | Rebuild spawning facility                |
| #4c  | Egg-take as compared with established hatchery goal   |                   | 4                   |   |    | Review of records; in compliance 3 out of last 3 years |  |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

|     |   | N/A | Yes | ? | No |   |  |
|-----|---|-----|-----|---|----|---|--|
| #4d | Green-egg to eyed-egg survival as compared with established goal                |     |     | 4 |    | No goal   | Develop green-egg to eyed-egg survival goal for IHOT Operations Plan |
| #4e | Eyed-egg to fry survival as compared with established goal                      |     |     | 4 |    | No goal   | Develop eyed-egg to fry survival goal for IHOT Operations Plan       |
| #4f | Fry to smolt survival as compared with established goal                         |     |     |   | 4  | Review of records; in compliance 2 out of last 3 years; installed bird control system | None   |
| #4g | Production as compared with established goal                                    |     | 4   |   |    | Review of records; in compliance 3 out of last 3 years                                |  |
| #4h | Percent survival (smolt to adult) as compared with established goal             |     |     | 4 |    | No goal   | Develop smolt-to-adult goal for IHOT Operations Plan                 |
| #4i | Number of eggs, fry, fingerlings, smolts, and/or adults to meet basinwide needs |     | 4   |   |    | Review of records/Discussion  |  |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

| PM # | Description of Performance Measure                            | Compliance Status |     |   |    | Basis for Compliance or<br>Non-Compliance | Remedial Action Needed for<br>Compliance |
|------|---|-------------------|-----|---|----|---|--|
|      |   | N/A               | Yes | ? | No |   |  |
| #5a  | <b>Temperature</b>  |                   |     |   |    |   |  |
|      | Does your water temperature meet the criteria for spawning?   |                   | 4   |   |    | Review of records/Discussion              |  |
|      | Does your water temperature meet the criteria for incubation? |                   | 4   |   |    | Review of records/Discussion              |  |
|      | Does your water temperature meet the criteria for rearing?    |                   | 4   |   |    | Review of records/Discussion              |  |
| #5b  | <b>Dissolved gases</b>  |                   |     |   |    |   |  |
|      | Is the oxygen level near saturation?                          |                   |     | 4 |    | No data                                   | Monitor DO and record                    |
|      | Is the dissolved nitrogen level less than saturation?         |                   |     | 4 |    | No data                                   | Monitor TGP and record                   |
| #5c  | <b>Chemistry</b>  |                   |     |   |    |   |  |
|      | Ammonia (un-ionized)  |                   |     | 4 |    | No recent data                            | Run analysis                             |
|      | Carbon Dioxide  |                   |     | 4 |    | See above                                 | See above                                |
|      | Chlorine  |                   |     | 4 |    | See above                                 | See above                                |
|      | pH  |                   |     | 4 |    | See above                                 | See above                                |
|      | Copper  |                   |     | 4 |    | See above                                 | See above                                |
|      | Hydrogen Sulfide  |                   |     | 4 |    | See above                                 | See above                                |
|      | Iron  |                   |     | 4 |    | See above                                 | See above                                |
|      | Zinc  |                   |     | 4 |    | See above                                 | See above                                |

**Table 2   Big Creek Hatchery - Winter Steelhead   Compliance With Performance Measures**

|     |  | N/A | Yes | ? | No |         |              |
|-----|--|-----|-----|---|----|---------|--------------|
| #5d | <b>Turbidity</b>                       |     |     |   |    |         |              |
|     | Does your turbidity meet the criteria? |     |     | 4 |    | No data | Run analysis |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

| PM # | Description of Performance Measure                     | Compliance Status |     |   |    | Basis for Compliance or<br>Non-Compliance | Remedial Action Needed for<br>Compliance |
|------|--|-------------------|-----|---|----|---|--|
|      |  | N/A               | Yes | ? | No |   |  |
| #5e  | <b>Alkalinity and hardness</b>                         |                   |     |   |    |   |  |
|      | Does your alkalinity and hardness meet the criteria?   |                   |     | 4 |    | No data                                   | Run analysis                             |
| #5f  | <b>Nitrite</b>   |                   |     |   |    |   |  |
|      | Does your nitrite meet the criteria?                   |                   |     | 4 |    | No data                                   | Run analysis                             |
| #5g  | <b>Contaminants</b>                                    |                   |     |   |    |   |  |
|      | Aldrin   |                   |     | 4 |    | No data                                   | Run analysis                             |
|      | Endrin   |                   |     | 4 |    | See above                                 | See above                                |
|      | Dieldrin   |                   |     | 4 |    | See above                                 | See above                                |
|      | Heptachlor   |                   |     | 4 |    | See above                                 | See above                                |
|      | Chlordane  |                   |     | 4 |    | See above                                 | See above                                |
|      | Methoxychlor   |                   |     | 4 |    | See above                                 | See above                                |
|      | Lindane  |                   |     | 4 |    | See above                                 | See above                                |
|      | Malathion  |                   |     | 4 |    | See above                                 | See above                                |
|      | Guthion  |                   |     | 4 |    | See above                                 | See above                                |
| #5h  | <b>Pathogens</b>                                       |                   |     |   |    |   |  |
|      | What portions of the hatchery have disease-free water? |                   |     |   |    |   |  |
|      | Adult holding  |                   |     |   | 4  | Inspection of facilities/Discussion       | None                                     |

**Table 2   Big Creek Hatchery - Winter Steelhead   Compliance With Performance Measures**

|  |               | N/A | Yes | ? | No |   |  |
|--|---------------|-----|-----|---|----|---|--|
|  | Incubation    |     |     | 4 |    | Limited spring water supply; no information on whether the spring is disease-free | Develop an additional 300 gpm of spring water for incubation and early rearing |
|  | Early rearing |     |     | 4 |    | See above   | See above  |
|  | Rearing       |     |     |   | 4  | Inspection of facilities/Discussion   | None   |
|  | Others        |     |     |   | 4  | Inspection of facilities/Discussion   | None   |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

| PM # | Description of Performance Measure   | Compliance Status |     |   |    | Basis for Compliance or Non-Compliance | Remedial Action Needed for Compliance                         |
|------|--|-------------------|-----|---|----|--|---|
|      |  | N/A               | Yes | ? | No |  |   |
| #6   | <b>Alarm Systems</b>   |                   |     |   |    |  |   |
|      | Do the following areas have alarms?  |                   |     |   |    |  |   |
|      | Intake   |                   |     |   | 4  | Inspection of facilities/Discussion    | Install intake alarm on Big Creek                             |
|      | Large rearing ponds and adult holding ponds                                    |                   |     |   | 4  | Inspection of facilities/Discussion    | Install alarms on large rearing ponds and adult holding ponds |
|      | Raceway headboxes and rearing ponds  |                   |     |   | 4  | Inspection of facilities/Discussion    | Install alarms on rearing ponds                               |
|      | Incubation facilities  |                   | 4   |   |    | Inspection of facilities/Discussion    |   |
|      | Quarantine areas and facilities  | 4                 |     |   |    | No quarantine areas and facilities     |   |
|      | Water treatment systems  | 4                 |     |   |    | No water treatment systems             |   |
|      | Security   |                   |     |   | 4  | Inspection of facilities/Discussion    | Install security alarms                                       |
|      | Are there outside systems and buzzers in onsite residences?                    |                   | 4   |   |    | Discussion                             |   |
|      | Are water flow alarms checked daily?   |                   | 4   |   |    | Review of records/Discussion           |   |
|      | Are all other alarms checked weekly?   |                   |     |   | 4  | Discussion                             | Check other alarms weekly                                     |
|      | Is there a log of alarms for emergencies, tests, and maintenance requirements? |                   |     |   | 4  | Review of records/Discussion           | Develop alarm log   |
|      | Are telephone pagers used?   |                   | 4   |   |    | Discussion                             |   |

**Table 2   Big Creek Hatchery - Winter Steelhead   Compliance With Performance Measures**

|    |   | N/A | Yes | ? | No |                              |                                |
|----|---|-----|-----|---|----|------------------------------|--------------------------------|
| #7 | Adult collection and holding facilities |     |     |   |    |                              |                                |
|    | Do you meet the adult holding criteria? |     |     |   | 4  | Review of records/Discussion | Rebuild adult holding facility |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

| PM # | Description of Performance Measure   | Compliance Status |     |   |    | Basis for Compliance or<br>Non-Compliance | Remedial Action Needed for<br>Compliance |
|------|--|-------------------|-----|---|----|---|--|
|      |  | N/A               | Yes | ? | No |   |  |
| #8   | <b>Incubation facilities</b>   |                   |     |   |    |   |  |
|      | Type 1: <u>Shallow troughs</u><br>Do you have an adequate number of units for the overall program?           |                   | 4   |   |    | Inspection of facilities/Discussion       |  |
|      | Type 2: <u>Deep troughs</u><br>Do you have an adequate number of units for the overall program?              |                   | 4   |   |    | Inspection of facilities/Discussion       |  |
| #9   | Type 3: <u>Vertical stack</u><br>Do you have an adequate number of units for the overall program?            |                   | 4   |   |    | Inspection of facilities/Discussion       |  |
|      | <b>Rearing facilities</b>  |                   |     |   |    |   |  |
|      | Type 1: <u>Concrete raceways (20x80)</u><br>Do you have an adequate number of units for the overall program? |                   | 4   |   |    | Inspection of facilities/Discussion       |  |

**Table 2   Big Creek Hatchery - Winter Steelhead   Compliance With Performance Measures**

|  |   | N/A | Yes | ? | No |                                     |  |
|--|---|-----|-----|---|----|-------------------------------------|--|
|  | Type 2: <u>Concrete raceways (10x160)</u><br><br>Do you have an adequate number of units for the overall program? |     | 4   |   |    | Inspection of facilities/Discussion |  |
|  | Type 3: <u>Pond</u><br><br>Do you have an adequate number of units for the overall program?                       |     | 4   |   |    | Inspection of facilities/Discussion |  |
|  | Type 4: <u>Canadian troughs</u><br><br>Do you have an adequate number of units for the overall program?           |     | 4   |   |    | Inspection of facilities/Discussion |  |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

| PM # | Description of Performance Measure   | Compliance Status |     |   |    | Basis for Compliance or<br>Non-Compliance | Remedial Action Needed for<br>Compliance |
|------|--|-------------------|-----|---|----|---|--|
|      |  | N/A               | Yes | ? | No |   |  |
| #10  | <b>Screening facilities</b>  |                   |     |   |    |   |  |
|      | Do you meet the approach velocity criteria?  |                   | 4   |   |    | Inspection of facilities/Discussion       |  |
|      | Are the fish screens regularly cleaned?  |                   | 4   |   |    | Inspection of facilities/Discussion       |  |
|      | Does the screen mesh meet screen opening criteria?   |                   | 4   |   |    | Inspection of facilities/Discussion       |  |
|      | Are rearing containers double screened for fish that should not be released to adjacent water? | 4                 |     |   |    | Released on station                       |  |
| #11  | <b>Predator control facilities</b>   |                   |     |   |    |   |  |
|      | Are your predation control facilities effective?   |                   | 4   |   |    | Inspection of facilities/Discussion       |  |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

| PM # | Description of Performance Measure   | Compliance Status |     |   |    | Basis for Compliance or Non-Compliance | Remedial Action Needed for Compliance         |
|------|--|-------------------|-----|---|----|--|---|
|      |  | N/A               | Yes | ? | No |  |   |
| #12  | <b>Food storage facilities and quality control</b>   |                   |     |   |    |  |   |
|      | Does the storage of dry/semi-moist/moist foods (dry<12%; semi-moist 12-20%; moist >20% moisture) follow food manufacturer's recommendations? |                   | 4   |   |    | Inspection of facilities/Discussion    |   |
|      | Does a regional quality control officer oversee production procedures and monitor:   |                   |     |   |    |  |   |
|      | Verification by feed manufacturer that ingredients meet specifications?  |                   |     |   | 4  | Discussion                             | Conduct IHOT QA/QC tests for feed preparation |
|      | Ensure feed does not contain unwanted drugs or other additives?  |                   |     |   | 4  | Discussion                             | See above                                     |
|      | Analyze ingredients contained in the final food product to ensure that feed specifications have been met?                                    |                   |     |   | 4  | Discussion                             | See above                                     |
|      | Are the foods stored and handled according to the following criteria?  |                   |     |   |    |  |   |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

|  |   | N/A | Yes | ? | No |                      |   |
|--|---|-----|-----|---|----|----------------------|---|
|  | Moist pellets should not exceed 10°F at point of delivery.  |     | 4   |   |    | Discussion           |   |
|  | Moist pellets should be removed from freezer just prior to feeding.   |     | 4   |   |    | Discussion           |   |
|  | Do not leave buckets of feed or feed containers outside exposed to light or heat.   |     |     |   | 4  | Discussion           | Follow IHOT protocols for not exposing feed or feed containers to light or heat |
|  | Open bags of feed should be fed within 1 to 2 days except when feeding small groups of fish.                              |     | 4   |   |    | Discussion           |   |
|  | Automatic feeder hoppers and bulk storage facilities should be insulated against excessive temperatures (80°F and above). | 4   |     |   |    | No automatic feeders |   |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

| PM # | Description of Performance Measure  | Compliance Status |            |   |    | Basis for Compliance or Non-Compliance                | Remedial Action Needed for Compliance          |
|------|---|-------------------|------------|---|----|---|--|
|      |   | N/A               | Yes        | ? | No |   |  |
| #13  | <b>Release facilities</b><br><br>Do the release facilities ensure that fish are not subjected to adverse conditions?  |                   |            | 4 |    | Inspection of facilities/Discussion                   | Review need for new fingerling release channel |
| #14  | <b>Pollution abatement facilities</b><br><br>Do the pollution abatement facilities meet all federal and state regulations (or good engineering practice)?<br><br>Are pollution abatement facilities operated correctly? |                   | 4<br><br>4 |   |    | Inspection of facilities/Discussion<br><br>Discussion |  |
| #15  | <b>Transportation facilities</b><br><br>Are the transport systems adequate to meet IHOT performance measures for transportation practices?  |                   | 4          |   |    | Discussion  |  |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

| PM # | Description of Performance Measure   | Compliance Status |     |   |    | Basis for Compliance or Non-Compliance | Remedial Action Needed for Compliance                             |
|------|--|-------------------|-----|---|----|--|---|
|      |  | N/A               | Yes | ? | No |  |   |
| #16  | <b>Broodstock selection practices</b>  |                   |     |   |    |  |   |
|      | Is the donor selection process document attached? (PM #40a)  | 4                 |     |   |    | Existing program; does not apply       |   |
|      | Was the donor selection outline followed in selecting the hatchery broodstock? (PM #40b-c)                 | 4                 |     |   |    | Existing program; does not apply       |   |
| #17  | <b>Spawning practices</b>  |                   |     |   |    |  |   |
|      | Were the appropriate number of spawners, male/female ratios, and fertilization protocols used? (PM #42c-g) |                   |     |   | 4  | Review of records/Discussion           | See PM #42  |
| #18  | <b>Incubation practices</b>  |                   |     |   |    |  |   |
|      | Are specific incubation standards listed in the hatchery operations plan?                                  |                   |     |   | 4  | Reviewed IHOT Operations Plan          | Develop written incubation standards for the IHOT Operations Plan |
|      | Are incubation practices written?  |                   |     |   | 4  | See above                              | See above   |
|      | Incubation Type 1: <u>Shallow trough</u> (see PM #8)<br>Do you meet the loading and flow criteria?         |                   | 4   |   |    | Review of records/Discussion           |   |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

|  |  | N/A | Yes | ? | No |                              |   |
|--|--|-----|-----|---|----|------------------------------|---|
|  | Incubation Type 2: <u>Deep trough</u> (see PM #8)<br>Do you meet the loading and flow criteria?    |     |     |   | 4  | Review of records/Discussion | Review IHOT flow criteria for deep troughs; may not be possible to push 18 gpm through deep troughs |
|  | Incubation Type 3: <u>Vertical stack</u> (see PM #8)<br>Do you meet the loading and flow criteria? | 4   |     |   |    | Not used for this stock      |   |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

| PM # | Description of Performance Measure                                     | Compliance Status |     |   |    | Basis for Compliance or<br>Non-Compliance | Remedial Action Needed for<br>Compliance                       |
|------|--|-------------------|-----|---|----|---|--|
|      |  | N/A               | Yes | ? | No |   |  |
| #19  | <b>Rearing practices</b>   |                   |     |   |    |   |  |
|      | Are specific rearing standards listed in the hatchery operations plan? |                   |     |   | 4  | Review IHOT Hatchery Operations Plan      | Develop written rearing standards for the IHOT Operations Plan |
|      | Are rearing practices written?   |                   |     |   | 4  | Review Hatchery Operations Plan           |  |
|      | Rearing Unit Type 1: <u>Concrete raceways (20x80)</u> (see PM #9)      |                   |     |   |    |   |  |
|      | Do you meet the density and DI criteria?                               |                   | 4   |   |    | Review of records/Discussion              |  |
|      | Do you meet the Loading and FI criteria?                               |                   | 4   |   |    | Review of records/Discussion              |  |
|      | Rearing Unit Type 2: <u>Concrete raceways (10x160)</u> (see PM #9)     |                   |     |   |    |   |  |
|      | Do you meet the density and DI criteria?                               | 4                 |     |   |    | Not used                                  |  |
|      | Do you meet the Loading and FI criteria?                               | 4                 |     |   |    | See above                                 |  |
|      | Rearing Unit Type 3: <u>Pond</u> (see PM #9)                           |                   |     |   |    |   |  |
|      | Do you meet the density and DI criteria?                               | 4                 |     |   |    | Not used                                  |  |
|      | Do you meet the Loading and FI criteria?                               | 4                 |     |   |    | See above                                 |  |
|      | Rearing Unit Type 4: <u>Canadian troughs</u><br>(see PM #9)            |                   |     |   |    |   |  |
|      | Do you meet the density and DI criteria?                               |                   |     | 4 |    | Review of records/Discussion              | Develop density criteria for Canadian troughs                  |

**Table 2   Big Creek Hatchery - Winter Steelhead   Compliance With Performance Measures**

|     |  | N/A | Yes | ? | No |                              |  |
|-----|--|-----|-----|---|----|------------------------------|--|
|     | Do you meet the Loading and FI criteria? |     |     | 4 |    | Review of records/Discussion |  |
| #20 | <b>Smolt quality</b>                     |     |     |   |    |                              |  |
|     | Do you produce a high quality smolt?     |     | 4   |   |    | Discussion                   |  |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

| PM # | Description of Performance Measure  | Compliance Status |     |   |    | Basis for Compliance or Non-Compliance | Remedial Action Needed for Compliance |
|------|---|-------------------|-----|---|----|--|---------------------------------------|
|      |   | N/A               | Yes | ? | No |  |                                       |
| #21  | <b>Fish health management practices</b>   |                   |     |   |    |  |                                       |
|      | Are the monthly hatchery monitoring visits being conducted? (PM #26)                            |                   | 4   |   |    | Review of records/Discussion           |                                       |
|      | Are the annual broodstock inspections being conducted? (PM #27)                                 |                   | 4   |   |    | Review of records/Discussion           |                                       |
|      | Is there pathogen-free water (PM #5h)and are the sanitation procedures being followed? (PM #28) |                   |     |   | 4  | Review of records/Discussion           | See PMs #5h and #28                   |
|      | Are the following water quality parameters within criteria? (PM #5a-5g)                         |                   |     |   |    |  |                                       |
|      | Water temperature   |                   | 4   |   |    | Review of records/Discussion           |                                       |
|      | Dissolved gases   |                   |     | 4 |    | Review of records/Discussion           | See PM 5b                             |
|      | Chemistry   |                   |     | 4 |    | Review of records/Discussion           | See PM 5c                             |
|      | Turbidity   |                   |     | 4 |    | Review of records/Discussion           | See PM 5d                             |
|      | Alkalinity and hardness   |                   |     | 4 |    | Review of records/Discussion           | See PM 5e                             |
|      | Nitrite   |                   |     | 4 |    | Review of records/Discussion           | See PM 5f                             |
|      | Contaminants  |                   |     | 4 |    | Review of records/Discussion           | See PM 5g                             |
|      | Are rearing standards being followed? (PM #19)  |                   |     |   | 4  | Review of records/Discussion           | See PM 19                             |

**Table 2   Big Creek Hatchery - Winter Steelhead   Compliance With Performance Measures**

|  |   | N/A | Yes | ? | No |                              |  |
|--|---|-----|-----|---|----|------------------------------|--|
|  | Are egg and fish transfer/release requirements met?<br><br>(PM #31) |     | 4   |   |    | Review of records/Discussion |  |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

| PM #  | Description of Performance Measure  | Compliance Status |     |   |    | Basis for Compliance or<br>Non-Compliance | Remedial Action Needed for<br>Compliance                          |
|-------|---|-------------------|-----|---|----|---|---|
|       |   | N/A               | Yes | ? | No |   |   |
| #22a  | <b>Does hatchery performance meet requirements outlined in the regional hatchery policies and in subbasin and hatchery plans for the following areas?</b> |                   |     |   |    |   |   |
| #22a1 | <b>Percent smoltification</b><br>Do you measure percent smoltification?<br>Do you have a smoltification goal<br>Did you meet the smoltification criteria? |                   |     | 4 | 4  | Discussion<br>Discussion<br>Discussion    | Develop smoltification goal and monitor<br>See above<br>See above |
| #22a2 | <b>Rearing density (prior to release)</b><br><br>Did you meet the rearing density criteria just prior to release?   |                   | 4   |   |    | Review of records/Discussion              |   |
| #22a3 | <b>Disease condition (at release)</b><br><br>Did you meet all disease regulations just prior to release?  |                   | 4   |   |    | Review of records/Discussion              |   |
| #22a4 | <b>Number (at release)</b><br><br>Did you meet the release number goal?   |                   | 4   |   |    | Review of records/Discussion              |   |
| #22a5 | <b>Size at release</b><br><br>Did you meet the size goal?   |                   | 4   |   |    | Review of records/Discussion              |   |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

|       |   | N/A | Yes | ? | No |                              |  |
|-------|---|-----|-----|---|----|------------------------------|--|
| #22a6 | <b>Dates of release</b>   |     |     |   |    |                              |  |
|       | Did you meet the release date goal?                                   |     | 4   |   |    | Review of records/Discussion |  |
| #22a7 | <b>Location of release</b>  |     |     |   |    |                              |  |
|       | Did you release the fish at the specified location?                   |     | 4   |   |    | Review of records/Discussion |  |
| #22b  | <b>Are fish reared in the subbasin or acclimated in the subbasin?</b> |     |     |   |    |                              |  |
|       | Are the fish reared in the subbasin?                                  |     | 4   |   |    | Discussion                   |  |
|       | Are the fish acclimated in the subbasin?                              |     | 4   |   |    | Discussion                   |  |
| #22c  | <b>Is the release strategy appropriate for the program?</b>           |     | 4   |   |    | Discussion                   |  |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

| PM # | Description of Performance Measure   | Compliance Status |     |   |    | Basis for Compliance or<br>Non-Compliance | Remedial Action Needed for<br>Compliance             |
|------|--|-------------------|-----|---|----|---|--|
|      |  | N/A               | Yes | ? | No |   |  |
| #23  | <b>Transportation facilities</b>   |                   |     |   |    |   |  |
|      | Do transportation equipment and personnel receive disinfection before and after use?   |                   | 4   |   |    | Discusson                                 |  |
|      | Is the fish tank interior disinfected using a solution of 200 ppm active chlorine for 30 minutes minimum or formaldehyde gas generation method (relative humidity of 60% for 2 hrs)? |                   | 4   |   |    | Discusson                                 |  |
|      | Is the exterior of the fish transport vehicle disinfected using high pressure steam (115-130°C), high temperature acid, or with 200 ppm chlorine for 30 minutes?                     |                   |     | 4 |    | Discusson                                 | Follow IHOT protocols for transportation facilities. |
|      | Is the fish transport vehicle (cab) disinfected using 600 ppm quaternary ammonia compounds (1.5 ml of 50% stock solution/liter water)?   |                   |     | 4 |    | Discusson                                 | See above  |
|      | Is other equipment disinfected including fish pumps, nets, egg sorters, waders, boots, rain gear, hoses and other equipment using one of the following solutions?                    |                   |     |   |    | Discusson                                 |  |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

|  |  | N/A | Yes | ? | No |           |  |
|--|--|-----|-----|---|----|-----------|--|
|  | 200 ppm chlorine for 30 minutes  |     |     |   |    | Discusson |  |
|  | 600 ppm quaternary ammonia compound for 30 minutes   |     |     |   |    | Discusson |  |
|  | 200 ppm iodophor solution for 10 minutes   |     |     |   |    | Discusson |  |
|  | Do personnel wear protective garments when handling fish eggs or cultural water?                                 |     |     |   |    | Discusson |  |
|  | Do the fish transport truck/chassis and tank/unit receive an inspection and service prior to the release season? |     |     |   |    | Discusson |  |
|  | Is a daily service inspection completed before starting up and leaving for the day?                              |     |     |   |    | Discusson |  |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

| PM #          | Description of Performance Measure   | Compliance Status |     |   |    | Basis for Compliance or Non-Compliance | Remedial Action Needed for Compliance           |
|---------------|--|-------------------|-----|---|----|--|---|
|               |  | N/A               | Yes | ? | No |  |   |
| #23<br>(cont) | <b>Transportation facilities</b>   |                   |     |   |    |  |   |
|               | Does the fish transport unit receive an inspection prior to loading?   |                   | 4   |   |    | Discussion                             |   |
|               | Does a pre-loading inspection covering tank water level, pumps or aerators, oxygen injection system settings, displacement gauge, and truck loading/hauling density tables checked and reviewed occur prior to loading fish in the transport unit? |                   | 4   |   |    | Discussion                             |   |
|               | Do hauling criteria include checking the fish 45 minutes to 1 hour after loading?  |                   | 4   |   |    | Discussion                             |   |
|               | When fish are active and systems are functioning properly, is the oxygen concentration reduced and maintained at approximately 8 ppm?  |                   | 4   |   |    | Discussion                             |   |
|               | Is water temperature in the transportation unit maintained within the 42-48 °F range?  |                   |     |   | 4  | Discussion                             | Follow IHOT temperature criteria for transport. |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

|  |  | N/A | Yes | ? | No |            |  |
|--|--|-----|-----|---|----|------------|--|
|  | Do fish releasing procedures include the following criteria?   |     |     |   |    | Discussion |  |
|  | Releasing the fish at the correct release site or into the correct water body.   |     | 4   |   |    | Discussion |  |
|  | Tempering or the difference between the liberation tank and the target water body should not exceed 10°F.  |     | 4   |   |    | Discussion |  |
|  | The liberation hose should be angled so that fish gently hit the water. Using a tripod is a method of ensuring the hose will stay at the proper angle. |     | 4   |   |    | Discussion |  |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

| PM # | Description of Performance Measure   | Compliance Status |     |   |    | Basis for Compliance or<br>Non-Compliance | Remedial Action Needed for<br>Compliance |
|------|--|-------------------|-----|---|----|---|--|
|      |  | N/A               | Yes | ? | No |   |  |
| #24  | <b>Evaluation practices</b>  |                   |     |   |    |   |  |
|      | Has the hatchery conducted fishery contribution studies to:  |                   |     |   |    |   |  |
|      | Determine the requirements for evaluating and improving management programs?   |                   |     |   | 4  | Discussion                                | Conduct fishery contribution studies     |
|      | Develop guidelines that define the geographical area and identify component stocks (hatchery and/or wild) that comprise the management unit? |                   |     |   | 4  | Discussion                                | See above                                |
|      | Develop guidelines that define if the proper stocks of fish are currently being used?  |                   |     |   | 4  | Discussion                                | See above                                |
|      | Determine which management units contribute to a specific fishery and the time periods of those contributions?                               |                   |     |   | 4  | Discussion                                | See above                                |
|      | Determine the relative contributions of the various management units to a specific fishery over the different time periods?                  |                   |     |   | 4  | Discussion                                | See above                                |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

| PM # | Description of Performance Measure   | Compliance Status |     |   |    | Basis for Compliance or<br>Non-Compliance | Remedial Action Needed for<br>Compliance |
|------|--|-------------------|-----|---|----|---|--|
|      |  | N/A               | Yes | ? | No |   |  |
| #25  | <b>Training practices</b>  |                   |     |   |    |   |  |
|      | Does the hatchery have a training schedule for its staff?  |                   | 4   |   |    | Review of records/Discussion              |  |
|      | Does each staff member have a personal training plan approved by a supervisor and reviewed annually? |                   | 4   |   |    | Review of records/Discussion              |  |
|      | Does the hatchery routinely exchange training details between other hatcheries and agencies?         |                   | 4   |   |    | Review of records/Discussion              |  |
|      | Does the hatchery encourage and reward off-duty training of staff?                                   |                   | 4   |   |    | Review of records/Discussion              |  |
|      | Does the hatchery conduct monthly staff meetings?  |                   | 4   |   |    | Review of records/Discussion              |  |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

| PM # | Description of Performance Measure  | Compliance Status |     |   |    | Basis for Compliance or<br>Non-Compliance | Remedial Action Needed for<br>Compliance |
|------|---|-------------------|-----|---|----|---|--|
|      |   | N/A               | Yes | ? | No |   |  |
| #26  | <b>Are monthly hatchery monitoring visits being conducted by a qualified fish health specialist as described below?</b> |                   |     |   |    |   |  |
|      | Conduct visit at least monthly  |                   | 4   |   |    | Review of records/Discussion              |  |
|      | Monitoring conducted by qualified fish health specialist  |                   | 4   |   |    | Review of records/Discussion              |  |
|      | Examine a representative sample of healthy and moribund fish from each lot.   |                   | 4   |   |    | Review of records/Discussion              |  |
|      | Review fish culture practices with hatchery manager.  |                   | 4   |   |    | Review of records/Discussion              |  |
|      | Report finding and results of necropsies on standard form.  |                   | 4   |   |    | Review of records/Discussion              |  |
|      | Recommend appropriate drug or chemical treatment.   |                   | 4   |   |    | Review of records/Discussion              |  |
|      | Summarize fish health status or stock prior to release or transfer to another facility.                                 |                   | 4   |   |    | Review of records/Discussion              |  |
| #27  | <b>Are all of the functions of the hatchery yearly monitoring visits being completed as described below?</b>            |                   |     |   |    |   |  |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

|  |  | N/A | Yes | ? | No |                              |  |
|--|--|-----|-----|---|----|------------------------------|--|
|  | Annually examine each broodstock for the presence of reportable viral pathogens.               |     | 4   |   |    | Review of records/Discussion |  |
|  | Annually screen each salmon broodstock for the presence of <i>Renibacterium salmoninarum</i> . |     | 4   |   |    | Review of records/Discussion |  |
|  | Conduct inspection by or under the supervision of qualified fish health specialist.            |     | 4   |   |    | Review of records/Discussion |  |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

| PM # | Description of Performance Measure   | Compliance Status |     |   |    | Basis for Compliance or Non-Compliance                           | Remedial Action Needed for Compliance  |
|------|--|-------------------|-----|---|----|--|--|
|      |  | N/A               | Yes | ? | No |  |  |
| #28  | <b>Is the hatchery following accepted sanitation procedures?</b>   |                   |     |   |    |  |  |
|      | Are there any sources of pathogen-free water, especially for incubation and early rearing?                                   |                   |     |   | 4  | Do not have enough spring water for incubation and early rearing | Provide pathogen-free water for incubation and early rearing (an additional 300 gpm is needed)   |
|      | Are the hatchery sanitation procedures understood and being followed as described below?                                     |                   |     |   |    |  |  |
|      | Disinfect/water harden eggs in iodophor?   |                   | 4   |   |    | Inspection of facilities/Discussion                              |  |
|      | Are foot baths containing disinfectant placed at the incubation facility's entrance and exit?                                |                   |     |   | 4  | Inspection of facilities/Discussion                              | Install foot baths   |
|      | Is equipment and rain gear utilized in broodstock handling or spawning sanitized prior to its use elsewhere in the hatchery? |                   |     |   | 4  | Inspection of facilities/Discussion                              | Follow IHOT protocols for sanitation of equipment and rain gear utilized in broodstock handling or spawning prior to its use elsewhere in the hatchery |
|      | Is equipment used to collect dead fish sanitized prior its use in another pond and/or lot of fish?                           |                   | 4   |   |    | Inspection of facilities/Discussion                              |  |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

|  |  | N/A | Yes | ? | No |                                     |   |
|--|--|-----|-----|---|----|-------------------------------------|---|
|  | Is equipment, including vehicles used to transfer fish between facilities, disinfected prior to use with any other fish lots or at any other location? | 4   |     |   |    | No transfers                        |   |
|  | Are rearing vessels sanitized after fish are removed and prior to introducing a new fish lot or stock?   |     |     |   | 4  | Inspection of facilities/Discussion | Follow IHOT protocols for sanitation of rearing vessels after fish are removed and prior to introducing a new fish lot or stock |
|  | Are dead fish properly disposed of?  |     | 4   |   |    | Inspection of facilities/Discussion |   |

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| PM # | Description of Performance Measure  | Compliance Status |     |   |    | Basis for Compliance or Non-Compliance | Remedial Action Needed for Compliance |
|------|---|-------------------|-----|---|----|--|---------------------------------------|
|      |   | N/A               | Yes | ? | No |  |                                       |
| #29  | <b>Are water quality parameters being followed?</b>                           |                   |     |   |    |  |                                       |
|      | Are the following water quality parameters within criteria? (PM #5a-5g)       |                   |     |   |    |  |                                       |
|      | Water temperature   |                   | 4   |   |    | Review of records/Discussion           | See PM #5b                            |
|      | Dissolved gases   |                   |     | 4 |    | Review of records/Discussion           | See PM #5c                            |
|      | Chemistry   |                   |     | 4 |    | Review of records/Discussion           | See PM #5d                            |
|      | Turbidity   |                   |     | 4 |    | Review of records/Discussion           | See PM #5e                            |
|      | Alkalinity and hardness   |                   |     | 4 |    | Review of records/Discussion           | See PM #5f                            |
|      | Nitrite   |                   |     | 4 |    | Review of records/Discussion           | See PM #5g                            |
|      | Contaminants  |                   |     | 4 |    | Review of records/Discussion           |                                       |
|      | Go to PM #21  |                   |     |   |    |  |                                       |
| #30  | <b>Are incubation and rearing standards being followed?</b>                   |                   |     |   |    |  |                                       |
|      | Are the incubation practices following the IHOT incubation criteria? (PM #18) |                   |     |   | 4  | Review of records/Discussion           | See PM #18                            |
|      | Are the rearing practices following the IHOT criteria? (PM #19)               |                   |     |   | 4  | Review of records/Discussion           | See PM #19                            |
|      | Go to rearing practices PM #18-PM #19   |                   |     |   |    |  |                                       |
| #31  | <b>Are egg and fish transfer/release requirements met?</b>                    |                   | 4   |   |    | Discussion                             |                                       |

**Table 2   Big Creek Hatchery - Winter Steelhead   Compliance With Performance Measures**

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| PM # | Description of Performance Measure   | Compliance Status |     |   |    | Basis for Compliance or<br>Non-Compliance         | Remedial Action Needed for<br>Compliance |
|------|--|-------------------|-----|---|----|---|--|
|      |  | N/A               | Yes | ? | No |   |  |
| #32  | <b>Is the hatchery's program outlined in a subbasin management plan?</b><br><br>Go to subbasin plan PM #1                |                   | 4   |   |    | Columbia Basin System Planning<br>Production Plan |  |
| #33  | <b>Is the hatchery operating under a current hatchery operational plan?</b><br><br>Go to operational plan PM #2          |                   | 4   |   |    | Review IHOT Operations Plan                       |  |
| #34  | <b>Is a hatchery monitoring and evaluation plan in place?</b><br><br>Go to hatchery monitoring and evaluation plan PM #3 |                   |     |   | 4  | Punch card data only                              | Develop written hatchery M&E plan        |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

| PM # | Description of Performance Measure  | Compliance Status |     |   |    | Basis for Compliance or<br>Non-Compliance | Remedial Action Needed for<br>Compliance |
|------|---|-------------------|-----|---|----|---|--|
|      |   | N/A               | Yes | ? | No |   |  |
| #35  | Does the hatchery program meet requirements established in the regional hatchery policies and subbasin planning documents in the following areas:<br><br>species, stock, broodstock collection location, broodstock numbers, broodstock collection strategy, and spawning and egg-take protocols? |                   |     |   |    |   |  |
|      | Does the hatchery program meet the requirements for the following?  |                   |     |   |    |   |  |
|      | Species protocols (PM #1)   |                   | 4   |   |    | Review of records/Discussion              |  |
|      | Stock protocols (PM #1)   |                   | 4   |   |    | Review of records/Discussion              |  |
|      | Broodstock collection location protocols (PM #41b for existing program; PM #39b for new program )   |                   | 4   |   |    | Review of records/Discussion              |  |
|      | Broodstock numbers protocols (PM #42c)  |                   | 4   |   |    | Review of records/Discussion              |  |
|      | Broodstock collection strategy protocols (PM #41b-d for existing program; PM 39b-f for new program)   |                   | 4   |   |    | Review of records/Discussion              |  |

**Table 2   Big Creek Hatchery - Winter Steelhead   Compliance With Performance Measures**

|  |                                | N/A | Yes | ? | No |                              |            |
|--|--------------------------------|-----|-----|---|----|------------------------------|------------|
|  | Spawning protocols (PM #42d-e) |     | 4   |   |    | Review of records/Discussion |            |
|  | Egg-take protocols (PM #42f-g) |     |     |   | 4  | Review of records/Discussion | See PM #42 |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

| PM # | Description of Performance Measure   | Compliance Status |     |   |    | Basis for Compliance or<br>Non-Compliance | Remedial Action Needed for<br>Compliance |
|------|--|-------------------|-----|---|----|---|--|
|      |  | N/A               | Yes | ? | No |   |  |
| #36  | <b>Does the hatchery's performance meet requirements outlined in the regional hatchery policies and in subbasin and hatchery plans for the following areas: percent smoltification, rearing density, disease condition, and the number, size date(s), and location of release?</b> |                   |     |   |    |   |  |
|      | Percent smoltification (PM #22a1)  |                   |     |   | 4  | Review of records/Discussion              | See PM #22a1                             |
|      | Rearing density (PM #22a2)   |                   | 4   |   |    | Review of records/Discussion              |  |
|      | Disease condition (PM #22a3)   |                   | 4   |   |    | Review of records/Discussion              |  |
|      | Number at release (PM #22a4)   |                   | 4   |   |    | Review of records/Discussion              |  |
|      | Size at release (PM #22a5)   |                   | 4   |   |    | Review of records/Discussion              |  |
|      | Date of release (PM #22a6)   |                   | 4   |   |    | Review of records/Discussion              |  |
|      | Location of release (PM #22a7)   |                   | 4   |   |    | Review of records/Discussion              |  |

**Table 2   Big Creek Hatchery - Winter Steelhead   Compliance With Performance Measures**

|     |   | N/A | Yes | ? | No |            |  |
|-----|---|-----|-----|---|----|------------|--|
| #37 | Are fish reared in the subbasin or acclimated in the subbasin?<br><br>See PM #22b |     | 4   |   |    | Discussion |  |
| #38 | Is the release strategy appropriate for the program?<br><br>See PM #22c           |     | 4   |   |    | Discussion |  |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

| PM # | Description of Performance Measure   | Compliance Status |     |   |    | Basis for Compliance or Non-Compliance | Remedial Action Needed for Compliance |
|------|--|-------------------|-----|---|----|--|---------------------------------------|
|      |  | N/A               | Yes | ? | No |  |                                       |
| #39  | <b>For new programs, has a broodstock collection plan been developed?</b>  |                   |     |   |    |  |                                       |
| #39a | Is the broodstock collection plan written?   | 4                 |     |   |    | Existing Program; does not apply       |                                       |
|      | For a non-captive broodstock program:  | 4                 |     |   |    | Existing Program; does not apply       |                                       |
| #39b | Was an unbiased, representative sample collected?  |                   |     |   |    |  |                                       |
| #39c | Was the recommended number of broodstock collected?  | 4                 |     |   |    | Existing Program; does not apply       |                                       |
|      | For a captive broodstock program:  |                   |     |   |    |  |                                       |
| #39d | Were captive brood progeny excluded as donors for propagating the next generation of the captive broodstock program? | 4                 |     |   |    | Existing Program; does not apply       |                                       |
| #39e | Were full-sib crosses avoided?   | 4                 |     |   |    | Existing Program; does not apply       |                                       |
| #39f | Is the broodstock collection plan understood and being followed by staff?  | 4                 |     |   |    | Existing Program; does not apply       |                                       |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

|      |  | N/A | Yes | ? | No |                                  |  |
|------|--|-----|-----|---|----|----------------------------------|--|
| #40  | <b>For a new program, was the donor selection outline followed in selecting the hatchery broodstock?</b> |     |     |   |    |                                  |  |
| #40a | Is a donor selection plan written?   | 4   |     |   |    | Existing Program; does not apply |  |
| #40b | Was the donor selection outline followed in selecting the broodstock?                                    | 4   |     |   |    | Existing Program; does not apply |  |
| #40c | Was the target stock recommended in the donor selection process actually used?                           | 4   |     |   |    | Existing Program; does not apply |  |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

| PM # | Description of Performance Measure  | Compliance Status |     |   |    | Basis for Compliance or<br>Non-Compliance | Remedial Action Needed for<br>Compliance   |
|------|---|-------------------|-----|---|----|---|--|
|      |   | N/A               | Yes | ? | No |   |  |
| #41  | <b>For existing programs, were the broodstock collection procedures followed?</b>             |                   |     |   |    |   |  |
| #41a | Is the broodstock collection plan written?  |                   |     |   | 4  | None provided                             | Develop written broodstock collection plan |
|      | Does the broodstock collection plan follow the guideline:                                     |                   |     |   |    |   |  |
| #41b | Was an unbiased, representative sample collected?   |                   |     | 4 |    | Discussion                                | See above                                  |
| #41c | Was the recommended number of broodstock collected?   |                   |     | 4 |    | Discussion                                | See above                                  |
| #41d | Were the broodstock collection procedures in hatchery operation plan understood and followed? |                   |     | 4 |    | Discussion                                | See above                                  |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

| PM # | Description of Performance Measure  | Compliance Status |     |   |    | Basis for Compliance or Non-Compliance                                | Remedial Action Needed for Compliance |
|------|---|-------------------|-----|---|----|---|---------------------------------------|
|      |   | N/A               | Yes | ? | No |   |                                       |
| #42  | Was the appropriate number of spawners, male/female ratios, and fertilization protocols used?                                     |                   |     |   |    |   |                                       |
| #42a | Are the spawning protocols written?   |                   |     |   | 4  | None provided   | Develop written spawning protocols    |
| #42b | Are daily or weekly spawning logs available?  |                   | 4   |   |    | Review of records   |                                       |
| #42c | Was the appropriate number of spawners used?  |                   | 4   |   |    | Discussion  |                                       |
| #42d | Did you attempt to spawn all collected broodstock and randomize mating with respect to age class, and other traits?               |                   | 4   |   |    | Discussion  |                                       |
| #42e | Was the sex-ratio within the limits given in the performance standards?   |                   | 4   |   |    | Discussion  |                                       |
| #42f | Were the fertilization protocols followed?  |                   | 4   |   |    | Discussion  |                                       |
| #42g | If the hatchery needed to reduce the number of eggs retained, was this done by representative sampling of each male/female cross? |                   |     |   | 4  | Selectively keeping late eggs to try to reestablish normal run timing | None                                  |

**Table 2 Big Creek Hatchery - Winter Steelhead Compliance With Performance Measures**

| PM # | Description of Performance Measure   | Compliance Status |     |   |    | Basis for Compliance or<br>Non-Compliance | Remedial Action Needed for<br>Compliance |
|------|--|-------------------|-----|---|----|---|--|
|      |  | N/A               | Yes | ? | No |   |  |
| #43  | <b>Is there a genetics monitoring and evaluation program in place?</b>   |                   |     |   |    |   |  |
|      | Is a genetics monitoring and evaluation program available?   |                   |     |   | 4  | None provided                             | Develop approved genetics M&E plan       |
|      | Does the plan address the following elements listed in IHOT:   |                   |     |   |    |   |  |
|      | Does the program have elements needed to meet evaluation goals 1-4?  |                   |     |   | 4  | Discussion                                | See above                                |
|      | Has a qualified geneticist reviewed and endorsed the program (goal 5)?   |                   |     |   | 4  | Discussion                                | See above                                |
|      | Will the program collect the data and maintain the records needed to evaluate compliance on an ongoing basis (goal 5)? |                   |     |   | 4  | Discussion                                | See above                                |
|      | Is the program understood and followed by staff?   |                   |     |   | 4  | Discussion                                | See above                                |

## Remedial Actions

Based on the compliance status for each performance measure, remedial actions were developed. The required remedial actions are organized into five categories. The types of categories range across a spectrum from those actions that are beyond human control, to those that require a change in agency policy or procedures, to those that involve a significant capital cost to put in place. The following are the five types of remedial actions identified under phase 1 of the audit:

### The Five Types of Remedial Actions

| Type | Description  |
|------|--|
| 1    | Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery |
| 2    | Remedial actions requiring changes in agency policies or procedures  |
| 3    | Remedial actions requiring changes in monitoring coverage or interval  |
| 4    | Remedial actions requiring significant capital expenditures  |
| 5    | Remedial actions that may require significant capital expenditures but are not clearly definable at this time          |

### Remedial Actions at Big Creek Hatchery - Winter Steelhead

This section presents the corrective actions required to bring the Big Creek Hatchery - Winter Steelhead program into compliance with IHOT performance measures. The remedial actions suggested here are just that, suggestions developed by the Montgomery Watson Audit Team. For some non-compliance areas, other remedial actions could be proposed. The required remedial actions are cross-referenced to each IHOT performance measure that was not in compliance. Where appropriate, the costs associated with the remedial actions are also presented (Table 3).

The cost estimates presented in this section are based on professional experience from similar projects. In most cases, only a lump-sum figure is presented, and detailed take-off lists have not been prepared. The cost estimates are essentially order of magnitude estimates ( $\pm 40\%$ ).

More importantly, the suggested remedial activities may also present several levels of action. Optional actions have been listed for several problems. These optional actions are desirable for either operational or safety considerations.

**Table 3. Remedial Actions Required at Big Creek Hatchery - Winter Steelhead**

| Remedial Action Required   | Cost | PMS <sup>1</sup> |
|--|------|------------------|
| <b>Type 1</b> - Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery                 |      |                  |
| Install security alarms  | ---- | 6                |
| <b>Type 2</b> - Remedial actions requiring changes in agency policies or procedures  |      |                  |
| Develop a written hatchery M&E plan  | ---- | 3                |
| Document adult contribution  | ---- | 4a               |
| Develop survival goal for green-egg to eyed-egg, eyed-egg to fry, and smolt to adult   | ---- | 4d-4f, 4h        |
| Follow IHOT procedures for checking other alarms weekly  | ---- | 6                |
| Develop alarm log  | ---- | 6                |
| Conduct IHOT QA/QC test for feed preparation   | ---- | 12               |
| Follow IHOT protocols for not exposing feed or feed containers to light or heat  | ---- | 12               |
| Develop written standards for incubation and rearing for the IHOT Operations Plan  | ---- | 18-19            |
| Review IHOT flow criteria for the deep trough incubators   | ---- | 18               |
| Review density criteria for early rearing  | ---- | 19               |
| Develop smoltification goal and monitor  | ---- | 22a1             |
| Follow IHOT protocols for transportation facilities  | ---- | 23               |
| Conduct fisheries contribution studies   | ---- | 24               |
| Install foot baths   | ---- | 28               |
| Follow IHOT protocols for sanitation of equipment and rain gear utilized in broodstock handling or spawning prior to its use elsewhere in the hatchery | ---- | 28               |

| Remedial Action Required  | Cost          | PMS <sup>2</sup> |
|---|---------------|------------------|
| <b>Type 2 (Continued)</b> - Remedial actions requiring changes in agency policies or procedures                                 |               |                  |
| Follow IHOT protocols for sanitation of rearing vessels after fish are removed and prior to introducing a new fish lot or stock | ---           | 28               |
| Develop written broodstock collection plan  |               | 41               |
| Develop written spawning protocols  | ---           | 42               |
| Develop approved genetics M&E plan  | ---           | 43               |
| <b>Type 3</b> - Remedial actions requiring changes in monitoring coverage or interval   |               |                  |
| Monitor DO and TGP and record   | ---           | 5b               |
| Run analysis for water chemistry parameters, turbidity, alkalinity, hardness, and contaminants                                  | ---           | 5c-5g            |
| <b>Type 4</b> - Remedial actions requiring significant capital expenditures   |               |                  |
| Rebuild adult holding and spawning facility   | \$2.0 million | 4b,7             |
| Install intake alarm on Big Creek   | \$10,000      | 6                |
| Install alarms on large rearing pond and adult holding ponds  | \$20,000      | 6                |
| Install alarms on rearing ponds   | \$10,000      | 6                |
| <b>Type 5</b> - Remedial actions that may require significant capital expenditures but are not clearly definable at this time   |               |                  |
| Develop an additional 300 gpm of disease-free water for incubation  | ---           | 5h, 28           |
| Review need for new fingerling release channel  | ---           | 13               |

## Hatchery Contribution to Fisheries, Spawning Grounds, and Hatcheries

This section presents the audit findings for the Big Creek Hatchery - Winter Steelhead program contribution of adult fish to fisheries, local fisheries, spawning grounds, and hatcheries. Data is reported by broodyear. A broodyear refers to the adult contribution from the eggs produced from a single group of spawning adults. For some species, this may include fish caught as 2-, 3-, 4-, 5-, and 6-year old fish. Because of the return distribution and data processing delays, the complete adult contribution for a given broodyear may not be available until 4 to 5 years after the fish have been released from the hatchery.

**Table 4. Adult Contribution to Fisheries, Spawning Grounds, and Hatcheries:**

### Big Creek Hatchery - Winter Steelhead

| <b>Year</b> | <b>Fisheries</b>   | <b>Spawning<br/>Grounds<sup>1</sup></b> | <b>Hatchery<sup>1</sup></b> | <b>Total<br/>Combined<br/>Contribution</b> | <b>Smolt to Adult<br/>Survival<br/>(percent)</b> |
|-------------|--------------------|---|-----------------------------|--|--|
|             | <b>(Broodyear)</b> | <b>(Broodyear)</b>                      | <b>(Broodyear)</b>          | <b>(Broodyear)</b>                         |  |
| 1983        |                    |   |                             |  |  |
| 1984        |                    |   |                             |  |  |

Data obtained from Missing Production Groups Annual Report or from the Regional Mark Information System database.

Total combined adult contribution; presented when it is not possible to subdivide the contribution into fisheries, spawning grounds, and hatchery contributions.

|      |                                |                                |                                |                                |                                |
|------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| 1985 |                                |                                |                                |                                |                                |
| 1986 |                                |                                |                                |                                |                                |
| 1987 | Complete data not<br>available | Complete data not<br>available | Complete data not<br>available | Complete data not<br>available | Complete data not<br>available |
| 1988 | Complete data not<br>available | Complete data not<br>available | Complete data not<br>available | Complete data not<br>available | Complete data not<br>available |
| 1989 | Complete data not<br>available | Complete data not<br>available | Complete data not<br>available | Complete data not<br>available | Complete data not<br>available |
| 1990 | Complete data not<br>available | Complete data not<br>available | Complete data not<br>available | Complete data not<br>available | Complete data not<br>available |
| 1991 |                                |                                |                                |                                |                                |
| 1992 |                                |                                |                                |                                |                                |

## Annual Operating Expenditures

The level and detail of annual operating expenditures varies widely depending on hatchery, operating agency, and funding source. When provided, expenditures were presented in terms of personnel costs, operating costs (power, feed, supplies), capital costs, indirect costs charged to the federal government, third-party costs, and other costs. These cost components were summed to determine a total hatchery annual cost. Based on discussion with the hatchery manager, the percent of total hatchery costs allocated to a given program was estimated. The total hatchery costs and the percent of hatchery costs allocated to a given program were used to compute the cost of a given program. Table 5 shows the annual operating expenses for the Big Creek Hatchery - Winter Steelhead program. For programs that occur at more than one facility (as shown on Table 1 in Section 3 of this report), the cost breakdown for the component(s) at each facility is presented in separate tables (Table 5a).

**Table 5. Annual Operating Expenses: Big Creek Hatchery - Winter Steelhead**

| Hatchery                   | 1994                            | 1995                            | 1996                            |
|----------------------------|---------------------------------|---------------------------------|---------------------------------|
| 1. Big Creek               | \$51,478                        | \$55,520                        | \$107,314                       |
| 2.                         |                                 |                                 |                                 |
| 3.                         |                                 |                                 |                                 |
| 4.                         |                                 |                                 |                                 |
| 5.                         |                                 |                                 |                                 |
| <b>Total Program Costs</b> | Total reported at<br>Gnat Creek | Total reported at<br>Gnat Creek | Total reported at<br>Gnat Creek |

The total expenditures for the Big Creek Hatchery are presented in Table 6 by program. The detailed breakdown of program expenditures at this hatchery are presented in separate tables (Tables 6a, 6b, 6c, 6d, and 6e).

**Table 6. Annual Operating Expenses - Big Creek Hatchery**

| <b>Program</b>                             | <b>1994</b>      | <b>1995</b>      | <b>1996</b>      |
|--|------------------|------------------|------------------|
| 1. Fall Chinook (Big Creek)                | <b>\$362,121</b> | <b>\$284,449</b> | <b>\$229,385</b> |
| 2. Fall Chinook (Big<br>Creek/Rogue River) | <b>\$210,277</b> | <b>\$136,115</b> | <b>\$214,984</b> |
| 3. Coho                                    | <b>\$140,688</b> | <b>\$131,696</b> | <b>\$157,331</b> |
| 4. Winter Steelhead                        | <b>\$51,478</b>  | <b>\$55,520</b>  | <b>\$107,314</b> |
| 5. Sea-run Cutthroat                       | <b>\$8,134</b>   | <b>\$0</b>       | <b>\$3,435</b>   |
| <b>Total Hatchery Costs</b>                | <b>\$772,698</b> | <b>\$607,779</b> | <b>\$712,449</b> |

**Table 5a. Annual Operating Expenses: Big Creek Hatchery - Winter Steelhead**

**Expenditure Occurring at Big Creek Hatchery**

| <b>Component</b>            | <b>1994</b>      | <b>1995</b>      | <b>1996</b>      |
|-----------------------------|------------------|------------------|------------------|
| Personnel Costs             | \$304,339        | \$274,232        | \$313,356        |
| Operational Costs           | \$215,988        | \$174,801        | \$162,612        |
| Capital Costs               | \$61,043         | \$1,632          | \$4,527          |
| Indirect Costs              | \$99,635         | \$78,622         | \$92,805         |
| Lumped Hatchery Costs       |                  |                  |                  |
| Lumped Third-Party Costs    | \$91,643         | \$78,493         | \$139,149        |
| <b>Total Hatchery Costs</b> | <b>\$772,698</b> | <b>\$607,779</b> | <b>\$712,449</b> |
| <b>Source of Funds</b>      |                  |                  |                  |
| Mitchell Act                | <b>88.1%</b>     | <b>87.1%</b>     | <b>80.5%</b>     |
| Bureau of Reclamation       | <b>2.3%</b>      | <b>3.0%</b>      | <b>2.9%</b>      |
| ODFW (R &E)                 | <b>9.5%</b>      | <b>10.0%</b>     | <b>16.6%</b>     |
| Program Production (lb)     | 17,531           | 20,602           | 33,333           |
| Total Production (lb)       | 263,146          | 225,532          | 221,296          |
| Program as Percent of Total | 6.7%             | 9.1%             | 15.1%            |
| <b>Program Costs</b>        | <b>\$51,478</b>  | <b>\$55,520</b>  | <b>\$107,314</b> |

When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.



**Table 6a. Detailed Expenditures at Big Creek Hatchery by Program**

**Fall Chinook (Big Creek Stock)**

| <b>Component</b>            | <b>1994</b>      | <b>1995</b>      | <b>1996</b>      |
|-----------------------------|------------------|------------------|------------------|
| Personnel Costs             | \$304,339        | \$274,232        | \$313,356        |
| Operational Costs           | \$215,988        | \$174,801        | \$162,612        |
| Capital Costs               | \$61,043         | \$1,632          | \$4,527          |
| Indirect Costs              | \$99,635         | \$78,622         | \$92,805         |
| Lumped Hatchery Costs       |                  |                  |                  |
| Lumped Third-Party Costs    | \$91,643         | \$78,493         | \$139,149        |
| <b>Total Hatchery Costs</b> | <b>\$772,698</b> | <b>\$607,779</b> | <b>\$712,449</b> |
| <b>Source of Funds</b>      |                  |                  |                  |
| Mitchell Act                | <b>88.1%</b>     | <b>87.1%</b>     | <b>80.5%</b>     |
| Bureau of Reclamation       | <b>2.3%</b>      | <b>3.0%</b>      | <b>2.9%</b>      |
| ODFW (R &E)                 | <b>9.5%</b>      | <b>10.0%</b>     | <b>16.6%</b>     |
| Program Production (lb)     | 123,322          | 105,552          | 71,250           |
| Total Production (lb)       | 263,146          | 225,532          | 221,296          |
| Program as Percent of Total | 46.9%            | 46.8%            | 32.2%            |
| <b>Program Costs</b>        | <b>\$362,121</b> | <b>\$284,449</b> | <b>\$229,385</b> |

When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.



**Table 6b. Detailed Expenditures at Big Creek Hatchery by Program**

**Fall Chinook (Big Creek/Rogue River Stock)**

| <b>Component</b>            | <b>1994</b>      | <b>1995</b>      | <b>1996</b>      |
|-----------------------------|------------------|------------------|------------------|
| Personnel Costs             | \$304,339        | \$274,232        | \$313,356        |
| Operational Costs           | \$215,988        | \$174,801        | \$162,612        |
| Capital Costs               | \$61,043         | \$1,632          | \$4,527          |
| Indirect Costs              | \$99,635         | \$78,622         | \$92,805         |
| Lumped Hatchery Costs       |                  |                  |                  |
| Lumped Third-Party Costs    | \$91,643         | \$78,493         | \$139,149        |
| <b>Total Hatchery Costs</b> | <b>\$772,698</b> | <b>\$607,779</b> | <b>\$712,449</b> |
| <b>Source of Funds</b>      |                  |                  |                  |
| Mitchell Act                | <b>88.1%</b>     | <b>87.1%</b>     | <b>80.5%</b>     |
| Bureau of Reclamation       | <b>2.3%</b>      | <b>3.0%</b>      | <b>2.9%</b>      |
| ODFW (R &E)                 | <b>9.5%</b>      | <b>10.0%</b>     | <b>16.6%</b>     |
| Program Production (lb)     | 71,611           | 50,509           | 66,777           |
| Total Production (lb)       | 263,146          | 225,532          | 221,296          |
| Program as Percent of Total | 27.2%            | 22.4%            | 30.2%            |
| <b>Program Costs</b>        | <b>\$210,277</b> | <b>\$136,115</b> | <b>\$214,984</b> |

When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.



**Table 6c. Detailed Expenditures at Big Creek Hatchery by Program**

**Coho**

| <b>Component</b>            | <b>1994</b>      | <b>1995</b>      | <b>1996</b>      |
|-----------------------------|------------------|------------------|------------------|
| Personnel Costs             | \$304,339        | \$274,232        | \$313,356        |
| Operational Costs           | \$215,988        | \$174,801        | \$162,612        |
| Capital Costs               | \$61,043         | \$1,632          | \$4,527          |
| Indirect Costs              | \$99,635         | \$78,622         | \$92,805         |
| Lumped Hatchery Costs       |                  |                  |                  |
| Lumped Third-Party Costs    | \$91,643         | \$78,493         | \$139,149        |
| <b>Total Hatchery Costs</b> | <b>\$772,698</b> | <b>\$607,779</b> | <b>\$712,449</b> |
| <b>Source of Funds</b>      |                  |                  |                  |
| Mitchell Act                | <b>88.1%</b>     | <b>87.1%</b>     | <b>80.5%</b>     |
| Bureau of Reclamation       | <b>2.3%</b>      | <b>3.0%</b>      | <b>2.9%</b>      |
| ODFW (R &E)                 | <b>9.5%</b>      | <b>10.0%</b>     | <b>16.6%</b>     |
| Program Production (lb)     | 47,912           | 48,869           | 48,869           |
| Total Production (lb)       | 263,146          | 225,532          | 221,296          |
| Program as Percent of Total | 18.2%            | 21.7%            | 22.1%            |
| <b>Program Costs</b>        | <b>\$140,688</b> | <b>\$131,696</b> | <b>\$157,331</b> |

When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.



**Table 6d. Detailed Expenditures at Big Creek Hatchery by Program**

**Winter Steelhead**

| <b>Component</b>            | <b>1994</b>      | <b>1995</b>      | <b>1996</b>      |
|-----------------------------|------------------|------------------|------------------|
| Personnel Costs             | \$304,339        | \$274,232        | \$313,356        |
| Operational Costs           | \$215,988        | \$174,801        | \$162,612        |
| Capital Costs               | \$61,043         | \$1,632          | \$4,527          |
| Indirect Costs              | \$99,635         | \$78,622         | \$92,805         |
| Lumped Hatchery Costs       |                  |                  |                  |
| Lumped Third-Party Costs    | \$91,643         | \$78,493         | \$139,149        |
| <b>Total Hatchery Costs</b> | <b>\$772,698</b> | <b>\$607,779</b> | <b>\$712,449</b> |
| <b>Source of Funds</b>      |                  |                  |                  |
| Mitchell Act                | <b>88.1%</b>     | <b>87.1%</b>     | <b>80.5%</b>     |
| Bureau of Reclamation       | <b>2.3%</b>      | <b>3.0%</b>      | <b>2.9%</b>      |
| ODFW (R &E)                 | <b>9.5%</b>      | <b>10.0%</b>     | <b>16.6%</b>     |
| Program Production (lb)     | 17,531           | 20,602           | 33,333           |
| Total Production (lb)       | 263,146          | 225,532          | 221,296          |
| Program as Percent of Total | 6.7%             | 9.1%             | 15.1%            |
| <b>Program Costs</b>        | <b>\$51,478</b>  | <b>\$55,520</b>  | <b>\$107,314</b> |

When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.



**Table 6e. Detailed Expenditures at Big Creek Hatchery by Program**

**Sea-run Cutthroat**

| <b>Component</b>            | <b>1994</b>      | <b>1995</b>      | <b>1996</b>      |
|-----------------------------|------------------|------------------|------------------|
| Personnel Costs             | \$304,339        | \$274,232        | \$313,356        |
| Operational Costs           | \$215,988        | \$174,801        | \$162,612        |
| Capital Costs               | \$61,043         | \$1,632          | \$4,527          |
| Indirect Costs              | \$99,635         | \$78,622         | \$92,805         |
| Lumped Hatchery Costs       |                  |                  |                  |
| Lumped Third-Party Costs    | \$91,643         | \$78,493         | \$139,149        |
| <b>Total Hatchery Costs</b> | <b>\$772,698</b> | <b>\$607,779</b> | <b>\$712,449</b> |
| <b>Source of Funds</b>      |                  |                  |                  |
| Mitchell Act                | <b>88.1%</b>     | <b>87.1%</b>     | <b>80.5%</b>     |
| Bureau of Reclamation       | <b>2.3%</b>      | <b>3.0%</b>      | <b>2.9%</b>      |
| ODFW (R &E)                 | <b>9.5%</b>      | <b>10.0%</b>     | <b>16.6%</b>     |
| Program Production (lb)     | 2,770            | 0                | 1,067            |
| Total Production (lb)       | 263,146          | 225,532          | 221,29           |
| Program as Percent of Total | 1.053%           | 0%               | 0.482%           |
| <b>Program Costs</b>        | <b>\$8,134</b>   | <b>\$0</b>       | <b>\$3,435</b>   |

When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.

PMs are performance measures that were extracted from the IHOT 1995 report. The IHOT performance measures are listed in Table 2 (Section 3 of this report) in numerical order.

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